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THE EARLY DIAGNOSIS OF TUBERCULOSIS IN CHILDREN.

WITH A COMPARISON OF THE CLINICAL AND X-RAY DIAGNOSIS.

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It will be readily admitted by those who have had much experience of tuberculosis that its early diagnosis in children presents difficulties which are not met with in the adult subject. This is largely due to the preponderance of the lymphatic system in children, and to the fact that in the great majority of cases tuberculous disease attacks the glands before implicating the lungs.

Cornet, Muller, and Barthez in Germany and Pottenger in America, as the result of much careful clinical and experimental work, have given it as their opinion that it is the exposed position of the lymph glands at the outer boundary of the body which stamps them as a second line of defence, diverting the attacks of pyogenic germs to themselves, and thus protecting the organism, while often sacrificing their existence in so doing. The fact that the cervical and thoracic glands are so frequently the seat of tuberculous disease does not imply that the tubercle germ has a special affinity for those glands, but is due to this area of absorption being more exposed to opportunities of infection. Cornet and Uffenheimer, as the result of an extensive series of experiments, proved the permeability of mucous membranes, and Cornet

formulated his law of localization. Tubercle bacilli which have entered the body develop, as a rule, in the organ which is susceptible for that special virus, immediately at the point of entry, or at least in the lymph glands situated nearest the primary seat of infection. Although there is seldom, if ever, implication at the point of entry of the virus, Dieulafoy found tubercle bacilli in 20 per cent. of his cases of adenoids, and Latham found them in seven out of forty-five tonsils which he had excised from children from three months to thirteen years of age.

The lymphatic glands of the human body exercise a toxic protective influence as well as affording protection through their anatomical structure. The bacilli by their toxins excite a hyperplasia of the fibrous elements in the glands, which gives rise to an inflammatory encapsulation, and in this manner forms the basis of natural healing. The chronic course and slow growth of tuberculous glands is doubtless due to the thrombosis and stasis of the lymph and blood currents produced by these toxins. This accounts for the slow development of tuberculous disease in glands, and also for the isolation to one set only of glands which one frequently finds. In other diseases, such as anthrax, lymph glands do not offer the same resistance to the spread of the disease, as the germ is in the blood and the extension is hæmatogenous.

It has been commonly supposed that tuberculosis can spread from the cervical glands by way of the tracheal and bronchial glands, and so infect the lung; but Most states that "there is no proof of any connection between these glands, and that this is anatomically impossible"; and further, "all that we can believe is that by morbid processes new passages are created, and that infection spreads by contiguity from gland to gland." This is highly improbable, and the fact that the X rays show us that the bronchial glands are frequently affected when the cervical are not points to direct infection of these glands through the mucous membrane.

As to the relative frequency with which various sets of glands are infected with tubercle, all the evidence available points to the bronchial glands as being more frequently infected, whether alone or in conjunction with the tracheal and cervical systems. Heubner says, "Tuberculosis in children has its seat in the bronchial glands." Biedert found that in 1,346 autopsies of tuberculous children with or without tuberculosis at the seat of origin of the disease (lungs and intestines) the bronchial glands were affected in 78 per cent. of the cases. Frobelius of Petrograd, in 416 autopsies of tuberculous children, found the bronchial glands affected in 99·2 per cent. It is thus evident that the bronchial glands hold the first place in frequency of infection in tuberculous disease in children.

It is precisely due to this fact that the early diagnosis of tuberculosis in children is so difficult, as so long as the enlargement of the glands

does not give rise to pressure symptoms there are few, if any, physical signs present to help us in our diagnosis. It is probable, however, that by the time attention has been drawn to the child's condition by such general symptoms as cough, loss of weight, pallor, loss of energy, etc., the disease has extended so as to produce changes in the normal physical signs in the lungs.

Before dealing with the symptoms of early tuberculosis it may be well to define what is understood by the bronchial glands. These may be divided into three groups: firstly, those which lie round the junction of the trachea and bronchi; secondly, those which lie in the bifurcation of the trachea; and thirdly, those which occupy the angles of division of the bronchi up to the third or fourth bifurcation. The last group, especially those on the right side, is the most important in so far that they are visible in skiagrams of the chest.

Can tuberculous disease of the bronchial glands be diagnosed by physical examination? The answer is I consider, in the negative, but, as I have mentioned, except in those rare cases where they give rise to pressure symptoms, one is rarely called upon to diagnose the disease at this stage. By the time definite symptoms are present there is generally some implication of the lung, but it is by no means uncommon to find children with definite symptoms in whom the X rays reveal no other pathological condition than that of enlarged bronchial glands.

Symptoms of Tuberculosis of Bronchial Glands.

The chief evidences of tuberculous involvement of the bronchial glands are the following: Persistent cough of a dry, hacking character, loss of weight and appetite, and a tired feeling. If the disease has progressed slightly, night-sweats, pain in the chest, dyspepsia, and anæmia may be present. It is rare to find all these symptoms, but loss of weight in a child who should be steadily gaining, combined with a dry, hacking cough, rough in character, coming on at intervals, lasting a short time, but frequently recurring, especially at night, should make one suspicious of tuberculosis. The cough has a certain resemblance to that of pertussis, but in this disease the attacks are more rhythmic, the expiration forced, and it is accompanied by the typical "whoop" or gasped inspiration. The child may not actually lose weight, but, what is equally significant, it may not have increased at the normal rate. If gastro-intestinal trouble can be excluded, this loss of or stationary weight is significant. As a rule, the child is pale and thin, but tuberculous disease of the bronchial glands may be present without much effect on the general health. Pain in the chest is most frequently complained of by boys after exercise. Loss of energy is not one of the earliest symptoms, as it is probably one of the results of toxæmia. Occasionally the child complains of a feeling of heaviness in the chest. There may also be pain between the shoulder-blades and sensitiveness

to pressure on the vertebræ, especially the second to the sixth dorsal. Newmann considers that the quickened pulse which one often finds in tuberculous children may have its cause in swelling of the bronchial glands. Paroxysms of pain in the region of the heart, without apparent cause, occasionally accompanied by a fit of coughing, are probably caused by compression and stimulation of the vagus nerve, perhaps of the cardiac plexus. The compression of sensitive branches of the vagus nerve lowers the reflex activity of the tracheal or bronchial mucous membrane, and increases the difficulty of removing any inspired germs, and so facilitates infection by causing catarrh. Possibly this is the reason for the appearance of tuberculosis after such infectious maladies as measles, as one frequently observes in taking the history of the child's illness that it dates from such an attack. Comparatively rare symptoms are hoarseness and aphonia caused by pressure on the recurrent laryngeal nerve. One cannot lay so much stress upon night-sweats in children as in adults, as many children sweat at night who are not tuberculous. Inquiry should be made as to how long they have lasted, and as to whether they are cold or hot. This night-sweating is often due to deficient ventilation of the sleeping apartment, and to the fact that children of the poorer classes often sleep three or four in a bed. Night-sweats never occur in a sanatorium where patients sleep in the open air.

Enlargement of the glands in the neck and supraclavicular spaces should be investigated, as they are frequently associated with bronchial gland infection. The value of enlarged cervical glands as a point in favour of tuberculous infection largely depends on the ability to exclude external sources of irritation, such as skin affections, carious teeth, pediculi, enlarged tonsils, and adenoids, and one too often forgets at the present time, since the name has fallen into disuse, that glands may be enlarged as the result of pyogenic scrofulosis, which is a distinct pathological entity, apart from tuberculosis, characterized by skin affections, blepharitis, catarrh of the middle ear, nasal cavity, and chronic or transitory swelling of lymph glands. These symptoms differentiate scrofulosis from tuberculosis, with the added fact that tubercle bacilli are never found in the glands. According to Bartels, the enlargement of the supraclavicular glands are of special significance, as they have a direct connection with the intrathoracic glands and drain the parietal pleura. The enlargement of the axillary glands is of very little diagnostic value.

Enlargement and swelling of the superficial veins of the chest are occasionally seen in bronchial gland disease, due to obstruction of the azygos vein by the glands. Further signs are bluish colouring of the face and nose (Siracoff), nose-bleeding, and rarely dysphagia. As an aid to diagnosis it is important to have a two-hourly record of the temperature kept, as the precise time at which fever may occur can

never be foretold. Wanderlich states that "when every precaution has been taken in making the observations it is impossible to draw a hard-and-fast line to indicate by the temperature the exact limits of health and disease." Temperatures taken after exercise are of no value, and the patient should rest before having them taken. Furgersen states that the normal range of temperature in children in the axilla varies between 97·2° F. and 99·4° F. Bronchial gland disease, however, may be present without any febrile indication. Pottinger considers that rigidity of the intercostal muscles in the two upper interspaces, between the midclavicular and parasternal lines, is a sign of some importance.

Physical Examination in Cases of Intrathoracic Tuberculosis.

Many of the greatest errors and difficulties associated with changes in percussion and auscultation have been the result of considering that they are due to tuberculous processes in the lung.

The character of the note obtained on percussion is made up not only of the lung tissue, but also of the chest covering, skin, muscles, etc., plus the lung structures, and it has been proved beyond all doubt that in early tubercular disease there is an increased tonicity of the muscles due to reflex spasm. In addition to this Schmorl contends that interference with the lines of communication (bronchi and vessels) causes considerable surface changes, chiefly those of collapse. One can readily understand how swelling of the bronchial glands, by pressing on the bronchi and vessels, may cause partial collapse of the lung beyond.

Percussion.—I find it best to begin the physical examination of children after inspection by percussion. The most important regions to percuss are the first two intercostal spaces in front, the suprascapular spaces, and an oval space situated on each side of the second, third, fourth, and fifth dorsal vertebræ for an inch or slightly more. This oval space, which Ewart first directed attention to, is normally dull, but an extension of the dullness beyond an inch on either side is of diagnostic importance in hilus disease. This dullness is not caused by the glands themselves, but is due to the same cause as the apical dullness—namely, interference with the lines of communication to the surface structures by the diseased glands. Rivière has devoted much attention to this space, and to him the credit is due of having directed attention to its true significance and value in diagnosis. Light percussion is of the greatest value, as otherwise many of the minor degrees of impaired resonance may be missed. Slight impairment to percussion is frequently found in the two upper intercostal spaces, especially on the inner side, also in the suprascapular spaces behind. The breath sounds may be normal, or we may have prolonged expiration and some weakening. Frequently the breathing is broncho-vesicular in type, and accompanied by increased vocal resonance. An increase of dullness in th

above-mentioned oval space, especially towards the right, is frequently found. Coarse crepitations and rhonchi are of little significance, and if heard all over the chest would rather point to bronchitic changes; but fine crepitations, if localized to the apices and persistent, are significant. Some clinicians lay stress on the presence of fine crepitations near the nipple. Cornet considers that percussion of the vertebral column is important. Marked impairment, with an increased feeling of resistance to percussion over the fifth and sixth spinal processes of the dorsal vertebræ, is considered by Michalovicz and Cozzolino to indicate enlargement of the bifurcation glands. Vertebral bronchophony with a whispering echo on the child repeating "three thirty three," if heard over the third, fourth, and fifth dorsal vertebræ, is held by some to point to enlargement of these same glands.

The most important point to decide in tuberculous disease in children is not its presence, but its activity, as if not active the child is in no immediate danger either to itself or to others, and this is probably the most difficult problem one has to solve. A diagnosis of activity will be a matter of probability more or less great according to the number and value of various items of evidence we can piece together. If we have a child with the typical cough, loss of weight and energy, night-sweats, and febrile temperature, with dullness at one or both apices, and an increase of size of the oval space of dullness posteriorly, with fine crepitations at the apex or apices, localized and persistent, these facts constitute evidence so strong as to be almost conclusive as to the presence of active tuberculous disease. In a case like that the factors are so weighty that they form almost a complete chain of evidence. Each case, however, presents a different clinical picture, and only long experience and careful, painstaking clinical work will give one the necessary skill to make a diagnosis from symptoms and physical signs. One frequently meets with cases in which the symptoms are suspicious, but in which the physical signs are not at all definite, and it is in these cases that we look for assistance from one or other of the special tests.

The Von Pirquet cutaneous test in children over three years of age only enables one to state, if it is positive, that the child at some time has been infected with tubercle. The quantitative cutaneous test of Ellerman and Erland appears likely to be the most reliable as to the presence of active disease, but our knowledge of it at present is not sufficient to enable us to put a precise value on it. Some work is at present being done at Yardley Sanatorium, Birmingham, the result of which promises to be a valuable addition to our present knowledge of this test.

X-Ray Examination.

The examination by the X rays gives us much more valuable and reliable evidence, but it must be borne in mind that a visual picture does not altogether solve the problem or give us absolute proof of the

activity of the disease. An X-ray examination can only be regarded as an important link in the chain of evidence confirming or negativing the diagnosis one has made from symptoms and physical signs. A negative result is of much greater value than a positive one. In children screening is of little value. A series of instantaneous stereo-skiagrams taken anteriorly, posteriorly, and laterally, just before inspiration is completed, fixes the more delicate changes sufficiently to be recognized.

Below I give a comparison of the clinical diagnosis with the diagnosis by X rays in 210 children between the ages of five and fourteen I have examined in the past two years.

TABLE SHOWING RESULTS OF AN EXAMINATION OF CHILDREN FOR INTRATHORACIC GLANDULAR TUBERCULOSIS.

X-Ray Examination.		
Positive.	Doubtful.	Negative.
53	10	4
52	19	10
7	12	43

Clinical Examination: Positive, 67; doubtful, 81; negative, 62.

In many cases a positive diagnosis by X rays is possible where even the most careful and painstaking clinician can only say that the physical signs are suspicious. Briefly, the following are the radiographic signs of early tubercular disease in children—that is to say, when either only the bronchial glands are involved or, which is more common, there is early implication of the lung. The normal hilus shadows are increased, especially on the right, which is more easily seen than the left on account of the heart shadow. In the normal lung numerous trabeculæ, or trunks, are seen stretching from the hilum out into the lung. If these are followed into the parenchyma of the lung, it will be seen that they radiate towards all parts of the lung periphery; but that about midway in the lung substance they break up into finer lines, which just fail to reach the pleura. In early tubercular disease these trabeculæ are thickened, and if the disease has gone a little farther it will be noticed that about the middle of the lung, where the finer lines are normal, small, irregularly circular, woolly-looking patches are to be seen. It is held by some that these thickened trunks are due to the invasion of the peribronchial tissue by tubercle bacilli, and that where the finer trunks are normally seen they leave the bronchial sheath, setting up disease of the lung tissue, represented by the woolly-looking patches. Other early signs are lessened diaphragmatic movement

on the affected side, and failure of the affected lobe or part of lung to "light up" during deep inspiration. The less thickened the trabeculæ are, the more likelihood is there that it is active disease. The correspondence between clinical diagnosis and that by X rays will be dealt with in another part of this article by Dr. Russell Green, but I should like to say that it is of the very greatest advantage to have closely associated a good clinician with a painstaking radiographer, as it sharpens the abilities of both. There is a wide field in this for research work, and the promise of great progress in the near future.

With reference to other tests, I may mention that Moro's percutaneous method is of greater value than Von Pirquet's, as it is less liable to give a reaction in inactive disease. It has also the advantage of being free from danger. A portion of tuberculin ointment (tuberculin with an equal part of lanoline) the size of a pea is rubbed into 5 cm. of the skin in the front of the chest. A weak reaction is got if after twenty-four to forty-eight hours five to ten discrete red papules of 1 to 2 mm. diameter appear; medium if by twenty-four hours many papules (up to 100) of 3 mm. appear and remain for several days; severe if after a few hours 100 or more papules appear and spread over the adjacent skin. I usually consider, for diagnostic purposes, if I get a reaction in eighteen hours, that the disease is active.

Tests with Tuberculin.

Lastly, in doubtful cases one can always use the subcutaneous test, but one must be certain by taking a two-hourly temperature for three days that it is normal before giving an injection. A convenient series of dilutions to give, which are also safe, are 0·0001 c.c., 0·0005 c.c., and 0·005 T. If a reaction is got with the first two dilutions, it is fairly safe to conclude that the disease is active. Many now use T.A.F. (albumin-free tuberculin) instead of T. If the first dilution gives no reaction, the second can be given in eight days, and so on.

The limitation of space at my disposal precludes me from discussing differential diagnosis, but I may say that chronic gastro-intestinal catarrh, bronchiectasis, apical collapse, apical tuberculosis, and chronic bronchitis, are the diseases most liable to be mistaken for glandulo-pulmonary tuberculosis in children. The presence of adenoids is occasionally apt to give rise to physical signs which might be mistaken for this disease also.

One has to piece together the evidence at one's disposal, and find out in what respect it falls short of being definite enough to enable one to pronounce the case as one of tuberculosis; and if so, to use all the means at one's disposal, including the above special tests, to, if possible, supply the missing links necessary to complete the chain. Personally, I consider that there is a great future before X-ray work, especially as many radiographers consider that our methods in use at present can be

greatly improved. Stereo-radiographic examination has added the scientific element to our study of this disease, and constitutes a most marked advance, pregnant of possibilities for the future.

A COMPARISON OF THE PHYSICAL SIGNS IN FORTY CASES OF EARLY OR SUSPECTED PULMONARY TUBERCULOSIS IN CHILDREN, WITH THE RESULTS FOUND ON EXAMINATION BY THE FLUORESCENT SCREEN, AND ILLUSTRATIVE OF THE USE OF X RAYS IN DIAGNOSIS.[1]

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The points to which attention is paid in screening a chest in a suspected case of tuberculosis are as follows:

1. The condition of the apices as regards volume and translucency, together with the degree of illumination on coughing.

2. The condition of the structures at the hilus. If more widened than usual, is the enlargement uniform in type? (referred to below as "glandular") or is it net-like? (referred to below as "reticulate"). Are calcified areas present? (indicative, presumably, of healed foci of tuberculosis) or are there fibrous processes extending peripherally into the lung tissue present?

3. Haziness, circumscribed or diffuse, in the lung-tissue, including the presence of mottling.

4. The movement of the diaphragm.

When the findings of percussion are at variance with the X-ray findings, preferential credence should be given to the X-ray findings, for the following reasons, based on a consideration of physics:

1. At the apices we are examining a portion of lung in a muscular "container," and the tone of this muscle may vary. The permeability of muscle substance to the X rays varies with its mass only, but its sound-conducting property quite probably, and its resonating property certainly, depends upon its tone. In Table I. below, where there is haziness on X-ray examination there is a corresponding dulness on percussion, but the converse does not hold, suggesting that in some cases dulness of the apices may be due to an extrapulmonary cause.

2. When deeply placed, areas of deficient aeration may be beyond

[1] This article is to be taken as supplemental to the preceding one contributed by Dr. John C. Macgown.

reach of percussion, and yet they will show nearly as clearly on X-ray examination as though they lay on the surface.

In the subjoined tabulation the clinical findings and the X-ray findings are placed side by side: in Table I. the clinical findings and the X-ray findings are in accordance, and in Table II. they are at variance.

TABLE I.—INDICATING PHYSICAL SIGNS AND X-RAY FINDINGS.

Physical Signs.	*Corresponding X-Ray Findings.*	*X-Ray Findings to which no Physical Signs were Discovered.*
1. Percussion note diminished at both apices.	Both apices hazy.	Hila enlarged. Fine fibrosis throughout lung.
2. Nil.	Nil.	Hila enlarged.
3. Percussion note diminished at right apex. Vocal resonance increased.	Apices slightly hazy.	Fine fibrosis throughout lung.
4. Percussion note diminished at both apices (ant.) and at right apex (post.)	Imperfect lighting of both apices, especially right.	Hila enlarged.
5. Percussion note diminished at both apices.	Apices light badly and are restricted in area.	Processes extending outwards from right hilum.
6. Percussion note diminished at both apices. Fine crepitations at left apex.	Left apex lights badly.	Chest as a whole lights badly.
7. Percussion note diminished at right apex. Crepitations at right apex. Coarse bronchitic sounds at right base.	Marked fibrosis in both lungs, which are hazy.	Nil.
8. Post-tussic suction along line of trachea.	Right apex shows emphysematous condition.	Enlarged hila, processes extending outwards on both sides.
9. Nil.	Nil.	Nil.
10. Percussion note diminished at left apex.	General haziness of left chest.	Hila enlarged. Reticulate.
11. Percussion note diminished at both apices.	Both apices hazy.	Hila enlarged, especially right. Fine fibrotic processes extending outwards. Small calcified spot in right hilum.
12. Percussion note diminished at right apex.	Right apex does not light as well as left.	Hila reticulate, processes extending outwards.
13. Diminished resonance at apices. Right apex in front only slightly so.	Both apices dull.	Both hila enlarged.

TABLE I.—INDICATING PHYSICAL SIGNS AND X-RAY FINDINGS—*Continued.*

Physical Signs.	*Corresponding X-Ray Findings.*	*X-Ray Findings to which no Physical Signs were Discovered.*
14. Apices percussion note diminished, also left infrascapular region.	Apices and adjacent portions of lung light badly.	Right hilum enlarged, with fibrotic processes.
15. Percussion note diminished at both apices. Vocal resonance increased at right apex (post.).	Slight haziness in upper portion of both lungs.	Right hilum enlarged, with well-defined fibrotic processes.
16. Percussion note diminished at right apex.	Slight haziness. Trabeculæ extending from right hilum to right apex.	Hila enlarged. Reticulate in type.
17. Percussion note diminished at left apex.	Mottling throughout, especially left apex.	Hila reticulate.
18. Percussion note diminished at right apex.	Right apex does not light up.	Right hilum enlarged and glandular in type.
19. Percussion note diminished at both apices.	Upper part of right lung hazy. Posterior apices hazy, especially right.	Hila enlarged, especially right.
20. Percussion note diminished at (?) left apex.	Nil.	Hila much enlarged.
21. Percussion note diminished at both apices, and at fifth and sixth intercostal spaces, also internal to angle of scapular.	Right apex does not light so well as left. Diffuse opacity throughout lungs.	Reticulations tending to diffuse throughout lungs.
22. Percussion note diminished at apices.	Apices not lighting well.	Hila enlarged.
23. Percussion note diminished at both apices.	Apical shadow restricted in area.	Hila enlarged. Right more than left. Movement of right diaphragm restricted.
24. Percussion note diminished at both apices.	Apices hazy, especially right.	Hila much enlarged. Trabeculæ extend from hilum towards apex.
25. Percussion note diminished at both apices.	Both apices light very badly.	Hila enlarged. Processes extend outward into lungs
26. Percussion note diminished at right apex.	Left apex hazy.	Hila enlarged, reticulate in type. Mottling in middle zone of chest.
27. Percussion note diminished at right apex.	Right apex does not light as well as left.	Nil.
28. Percussion note diminished at right apex.	Right apex does not light as well as left.	Nil.

TABLE II.—PHYSICAL SIGNS AND X-RAY FINDINGS AT VARIANCE.

Physical Signs.	*Corresponding X-Ray Findings.*	*X-Ray Findings to which no Physical Signs were Discovered.*
1. Percussion note diminished at both apices. Vocal resonance increased.	Nil.	Haziness on Right side. Dense nodules in right hilum.
2. Percussion note diminished at left apex and right base.	Nil.	Enlarged hila, coarse fibrotic processes extending outwards. Calcified spots.
3. Percussion note diminished at right apex. Vocal resonance increased at right apex.	Nil.	Fine network in lungs.
4. Percussion note diminished at both apices.	Nil.	Right lung less clear than left lung. Hila enlarged, reticulate in type.
5. Percussion note diminished at both apices.	Nil.	Fine fibrosis through lung. Hila enlarged.
6. Percustion note diminished at right apex.	Nil.	Enlarged hila, with fibrotic processes extending outwards on right side. Slight haziness of left apex.
7. Percussion note diminished at both apices.	Nil.	Hila enlarged, especially left.
8. Percussion note diminished at both apices.	Nil.	Hila reticulate; both lungs hazy.
9. Percussion note diminished at left apex.	Nil.	Hila enlarged, reticulate in type.
10. Percussion note diminished at both apices.	Nil.	Right hilum enlarged. Considerable fibrosis through lungs.
11. Percussion note diminished at right apex.	Nil.	Hila increased, reticulate in type.
12. Percussion note diminished at right apex.	Nil.	Right hilum reticulate, processes extending outwards.

It will be observed that in every case in Table II. enlargement of the bronchial glands was found. It may be that this enlargement causes the apical dulness, by interfering with the "lines of communication" (bronchi and vessels) or, through pressure of the sympathetic system, causing increased tonus of the chest muscles.

SOME MISCONCEPTIONS AS TO METHODS USED IN COMBATING TUBERCULOSIS.

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At the present time there would seem to be considerable confusion of thought in the minds of both the profession and the laity as to how tuberculosis should be treated in individual cases, and with a view to eradicating the disease. The relative position of rest and exercise does not appear to be properly understood. I would suggest that two axioms should always be borne in mind, when treating cases of pulmonary tuberculosis: (1) Never think about work and exercise in the treatment of early cases of the disease; and (2) Never be satisfied with treatment which does not have for its aim the restoration of the patient to full working capacity, and with powers enabling him or her to live an ordinary rational life: this usually implies a return to the patient's previous occupation.

In recent years so much has been written about farm colonies and labour for tuberculous patients, that we are in danger of forgetting that such measures are only necessary because the patients concerned have been denied rest in the earlier active sensitive part of their progress. Even under these circumstances systematized exercise and work are often comparatively useless. Any measure of success which has resulted from sanatorium treatment has followed in the main from taking patients away from their work and placing them in bed at a time when, to an ordinary observer or to a sanatorium physician who does not take a correct rectal temperature, these patients appear to be capable of walking about, or even participating in various forms of work.

Owing to the vogue of what Dr. Marcus Paterson has called "Graduated Labour,"[1] and which might be more correctly styled "Graduated Rest,"[1] many medical men have come to the conclusion that patients when walking about and continuing their customary occupations can suffer no harm in the early stages of the disease. It should be remembered that when Dr. Paterson was first led to make his experiment by treating cases of pulmonary tuberculosis by graduated labour, he was not dealing with early cases. When we consider how diagnoses were made at that time, we see that this was unavoidable.

[1] See article on "Graduated Rest in the Treatment of Pulmonary Tuberculosis," *Lancet*, p. 976, 1909.

Dr. Paterson did the best that could be done under unfavourable circumstances. Thus in his well-known work,[1] a volume containing a large amount of useful information, he says, "I had observed that many tuberculous patients, who had followed their ordinary occupations up to the time of admission, were in a very fair condition of health"; and he cites the case of a navvy who "had worked for forty hours almost without rest, altering a large watermain, a few days before his arrival; and, although he had *extensive physical signs*, was apparently none the worse for such arduous work." This man was obviously a chronic patient, probably of long standing, with little prospect of real cure, and if in this case the chronic inflammation resulting from hard work resulted in the production of sufficient but not too great fibrosis, or more doubtfully if auto-tuberculin was distributed by this means to toxin unsaturated tissues with the consequent production of antibodies, then in either case good might be accomplished. The lesson, however, to be learned from such a case is that this man had gone on working in the early active stage of the disease; yet because he had a powerful resistance, and therefore at that time might have been easily cured, had not succumbed, but had become chronic and largely insensitive to the tubercular toxins.

The aim of sanatoriums should be to prevent the formation of chronic tuberculous cases. It is often urged that it is impossible to provide accommodation in sanatoriums for all early cases, and it is suggested that we should fall back on other methods such as segregration in farm colonies and chest hospitals for advanced cases. It would seem obvious that the latter method is as expensive or more so than the former. It is further urged by many that it is the seed and not the soil that is the more important factor in tuberculous disease, and that infection is the chief cause of the continuance of the trouble. With this dictum I am inclined to agree, but when it is assumed that the best method to pursue is to isolate these cases compulsorily, I most strongly dissent. If we attempt to put pressure on these cases and to isolate them, remembering how widespread is the incidence of tuberculous disease, and that it is usually non-fatal, we immediately raise a storm of opposition, and cases will cease to be notified until they have reached the second or third stage. There will thus be left living among the population a large number of infectious cases which will continue to propagate tuberculous disease, and which will be denied treatment because they will have to assume that they are quite well, or the disease will have to be treated under some other name. Therefore, though it may be a good thing to isolate as many bad cases as possible voluntarily, we must avoid stultifying all our measures by making too much of this method.

[1] See Dr. Marcus Paterson's "Auto-Inoculation in Pulmonary Tuberculosis," p. 12, published in 1911 by Nisbet.

I am convinced, however, from experience that if suitable hospitals are provided it will become increasingly easy to get bad cases to enter institutions voluntarily, and to remain at any rate for as long as we wish to keep them.

The other aspect of the problem is that patients should be admitted to sanatoriums early, and, if possible, before tubercle bacilli are found, and of course before physical signs are marked. If cases on the basis of the existence of definite symptoms of activity, and especially when the first case occurring in a family were immediately admitted to a sanatorium, we should be saved the trouble and expense of treating a large number of patients. Any one with experience knows that if a case occurs in a family otherwise free from tuberculous disease, and is allowed to remain there until willing to submit to segregation, or until able to be sent to a sanatorium in the second or third stage, that the chances of further cases occurring at varying intervals are very great. If a prompt method were pursued, we should be a very long way towards eradicating tuberculous disease, and at the same time there would be no conflict between the supposed interests of the public and those of the patient. It should be remembered that if early cases are to be obtained at a time when treatment will be successful, they must be made to understand that if favourable, they will have an excellent chance of returning to the community as ordinary citizens, being indeed in the condition of many of the rest of the population, who, though infected, have managed to bring the disease to an end without special treatment.

Finally, we must remember that the useful treatment of pulmonary tuberculosis, just as in the treatment of tuberculosis affecting a large joint, consists for the most part in the application of rest, and that if early cases of pulmonary tuberculosis were put to bed in a sanatorium and afterwards brought to a condition of full physical vigour by sufficient work, which can always be found at any reasonable sanatorium, many valuable lives could be restored to the ordinary community, and much potential infection avoided.

The rest here mentioned does not mean absolute rest or typhoid rest, which as a rule is only necessary (and then seldom permanently useful) in cases which have become febrile and are completely toxin saturated. Such a condition seems to be owing to auto-inoculation having got the upper hand of fibrosis, a condition produced in unfavourable cases by taking exercise unwisely. The rest I refer to is best obtained at a sanatorium, as the absence of relatives is often necessary, and a separate room should be provided; then, if the case is really early, it is unlikely to be prolonged or irksome.

THE USE OF CONTINUOUS INHALATION IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

By C. MUTHU,

M.D., M.R.C.S., L.R.C.P.,

Chief Physician, Mendip Hills Sanatorium, Wells; author of "Pulmonary Tuberculosis and Sanatorium Treatment."

Of late years there has been a steady revival of continuous inhalation in the treatment of pulmonary tuberculosis. Antiseptic inhalation is a remedy as old as the ancient Indians and Greeks. Charaka, Susruta, Hippocrates, Galen, Laennec, are some of the classical names that figure in the history of inhalation treatment. Coming to our own times, many distinguished names are connected with the advocacy of the method, such as Sir W. Roberts, Dr. Coghill, Dr. Burney Yeo, Dr. Wilson Fox, in England; Dr. Beverley Robinson, in New York; Dr. Ruata, in Perugia; and, lately, Dr. David Lees and Dr. Minchin stand prominently in their approval of this form of treatment for pulmonary consumption. The writer has been treating pulmonary tuberculosis with antiseptic inhalation since 1895, and in combination with sanatorium treatment since 1899. For this purpose he has devised an inhaler after the pattern of Dr. Burney Yeo and Dr. Ruata, which combines all the advantages of previous appliances without their disadvantages. Antiseptic drugs used for inhalation purposes must be more or less volatile, and should be easily taken into the lungs in the form of vapour with the inspired air. Two groups of solutions are in common use—the formaldehyde group and the guaiacol group. The first is found in what I call my A mixture, the second in C and D mixtures, and both in B mixture.[1] Formaldehyde stands first, as it is not only a strong germicide, but is highly volatile, and possesses a great penetrating power into tissue cells. It is first introduced to the patient in A mixture, which is a mild combination, containing only 2½ per cent. in strength, and made pleasant with the addition of menthol, pine, and chloroform. B mixture is a stronger inhalant, containing 5 per cent. of formaldehyde, with guaiacol, menthol, and pine dissolved in chloroform and alcohol. In this way we have given formaldehyde in hundreds of cases without any difficulty. The inhalant possesses the property of hardening the mucous membrane of the nose and the air passages, and patients do not feel any inconvenience after

[1] These preparations can be obtained ready for use from Messrs. Oppenheimer, Son and Co., Ltd., who also supply the form of oro-nasal inhaler which I consider the most desirable for general use.

its use. From A mixture the patients go on to use B and C mixtures. These are our standard mixtures, and more generally used; while D mixture, which contains guaiacol, iodine, terebene, and pine, with chloroform and alcohol, is kept as an alternate solution or for night use. By thus using all the solutions in succession, the patient is given the advantage of trying many antiseptic drugs in the course of the treatment. Our patients wear the inhaler at least eight hours or even more a day for the first few weeks. They are encouraged to keep on the mask at every opportunity, from the time they wake up in the morning till late at night, and some continue the inhalation even during the night. As the patients improve and the disease shows signs of arrest, the time is gradually reduced to six, four, and two hours a day.

After many years of close observation, I have no doubt in my mind that by continuous inhalation volatile antiseptics in the form of vapour mixed with air do enter the alveoli, as well as exercise influence on the bronchial passages. The inhalants are slowly absorbed into the blood in the lungs. Case after case that has got well when other measures have failed seems to show that in some way antiseptic inhalations help to check, if not destroy, the morbid activity of bacterial organisms. Improvement is evidenced clinically by the diminution of cough and lessening of expectoration and a reduction in temperature. Other advantages of the inhaler may be enumerated. It affords protection against strong winds and dust when taking walking exercise. Infectious "colds," and influenza are practically unknown in a sanatorium where antiseptic inhalations are systematically used. When visitors introduce a catarrhal infection from outside, the use of the inhalant mask prevents "colds" from spreading downwards or starting fresh mischief in the lungs. The proper use of the inhaler also makes the patient take a deeper breath. It further provides a certain amount of resistance, and favours the flow of blood into the lungs after the manner of Kuhn's suction mask, and it appears to facilitate healing. Speaking from many years' experience, I do not hesitate to claim that inhalation treatment is very simple, can be used at all times, incurs no risk (it is best not to use the mask during an attack of hæmoptysis), and can be carried out at home with advantage if a sanatorium is not available. I hold that if this method is carried out with perseverance and enthusiasm, it will prove to be a success in many cases of consumption. I venture to express my own views and experiences in this brief article in the hope that many medical practitioners may be induced to give the method I have endeavoured to describe a fair trial.

THE INVISIBLE WOUND: A PLEA FOR TUBERCULOUS PENSIONERS.

By HENRY BEALE COLLINS,
M.R.C.S., L.S.A., D.P.H.,
Medical Officer of Health for the Borough of Kingston-upon-Thames.

Amongst the many tragedies which will follow on in the wake of th great war, none will be more difficult to ease and ameliorate than the lot of those sailors and soldiers who have developed tuberculosis of the lungs or other vital organs whilst braving the hardships of the great campaign. These tragedies are no mere melodramatic exaggerations, but real tragedies following relentlessly on the patriotism of young England. Civilian life was given up, and many a lad who could have worked hard through a long life has broken down under the violent strain of the campaign. Some were taken for service who were not fit, and where Government officials have been guilty of mistakes it is the duty of the Government to make good as far as is possible.

In the navy and army, when men are believed to be suffering from tuberculosis, they are sent to hospital, and later on, where possible, to a sanatorium. In a sanatorium they live under ideal conditions, and many assume an appearance of robust health, which masks their disease in a way to deceive laymen and even some physicians. They are able to do gardening, they take long walks, they play golf or other games not involving violent exercise, and to the outsider they seem to be on the high road to recovery, if not completely cured, and fit to face the struggles of the outside world. Unfortunately, this improvement is not real. It may disappear rapidly if there ceases to be careful dieting, with absence from worry and anxiety. The regular hours, the fine air, the hour's rest before lunch and again before dinner, are all of immense importance, not merely for the time of direct treatment, but for the whole of the consumptive's future life. These are some of the reasons why the State must do its best to place the sufferer from this invisible wound in as good a position as the man who has lost an arm or a leg, which on a glance arouse sympathy, but which are often of very little inconvenience to the man's civilian occupation. The surgeon can perform an operation whilst standing on an artificial leg; he may easily suffer a breakdown from hard work if he has a temporarily healed lesion of his lung.

The object of this short article is to emphasize the necessity for equal treatment for the visible wound and the invisible injury. The men with the visible wound have to suffer no delay whilst waiting for

the fixing of their permanent pensions. The men with the invisible injury have to bear up against the worry of delay, and the anxiety as to the future militates greatly against their having any future at all.

Here is the answer of the Ministry of Pensions to the letter of a young officer: "As regards the period for which temporary retired pay is usually awarded, I am to inform you that this must necessarily depend on the opinion of the medical authorities as to the period for which the existing degree of disablement, or effects of aggravation, is likely to continue." My own experience, both as a patient and as a doctor, tells me that even the highest authorities cannot definitely fix these periods in the majority of cases. I myself had the first breakdown at twenty-six years of age. Several leading physicians examined me, but were unable to discover any signs of lesions when I had apparently recovered my health. Fourteen years later, after the strain of medical service in connection with a big scarlet fever outbreak, I had a more serious attack, but at the end of a year no physical signs could be discovered. Now, after another twenty-four years, I am in a sanatorium with trouble in one vocal cord. All through life I have found just sufficient work to provide for my necessities without undue worry or excitement, until poor food and extra work brought me down again. My own case may be fairly typical of many others if the authorities can place them under similar conditions. That gives thirty-six years of useful work and two of incapacity. The above quoted letter continues: "There is good reason to hope that effective sanatorium treatment may in many cases have the result of materially improving the patient's condition." What is the use of that to the holder of a temporary pension? The letter finishes up—"and possibly of restoring him to health." The latter result is possible if the patient could be free from anxiety, and the fear that if he should appear to be restored to health the temporary pension may cease.

The authorities appear to imagine that cases of tuberculosis of the lungs can be grouped into four classes: (1) Those who are cured and fit to enter on work in competition with persons in robust health; (2) those with a good chance of living to an advanced age under a careful conduct of life absolutely free from anxiety and worry; (3) those in a more doubtful position, whose only chance is a sheltered life equivalent to residence in a sanatorium; (4) those who are undoubtedly entitled to the highest pension available for complete incapacity arising from war service. As far as my experience goes, the first class is non-existent. Those persons who appear to be so are not actually tuberculous, but might easily become so under inciting conditions.

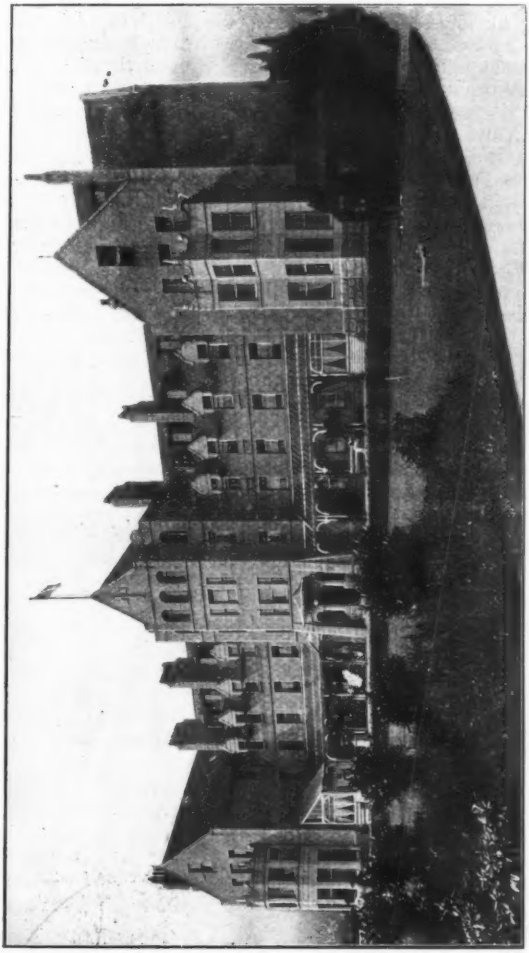
If the Ministry of Pensions will only make up its mind quickly, and relieve these tuberculous men from worry and anxiety for the future, their length of life may be greatly increased. Of course, the longer

they live the greater will be the charge on the pension fund; but who is going to grudge that to men who have been wounded or disabled in the fray?

To sum up, much useful work will be possible for men in the early stages of tuberculosis, even for those in which the diagnosis has been confirmed by bacteriological examination as an "open" case; but it must always be remembered that such work can only be done under sanatorium conditions of work and hours of rest, with suitable food, and absence of overstrain, worry, and undue excitement. The further the departure from sanatorium regimen, the more certain is it that the invisible wound will reopen, and the life will be short.

INSTITUTIONS FOR THE TUBERCULOUS.

TOR-NA-DEE SANATORIUM.



THE TOR-NA-DEE SANATORIUM, MURTLE, ABERDEENSHIRE, SCOTLAND.

DEESIDE, in Scotland, now possesses a new sanatorium. Like those other Scottish institutions, the New Duff House Sanatorium at Banft

and the Nordrach-on-Dee Sanatorium on Deeside, it owes its inception to the enterprise of Dr. David Lawson of Banchory. The primary purpose is to endeavour to assist in meeting the great demand for sanatorium treatment which the war has created on the part of officers of His Majesty's forces. With that object in view for the duration of the war, the nomination of all the beds—seventy in number—has been handed over to the Scottish Branch of the British Red Cross Society. When peace comes the institution will take its place amongst those other sanatoria which the needs of the nation have called into being. Something like £30,000 has been expended, and the new sanatorium is thoroughly and efficiently equipped. There is an X-ray room, a powerful Röntgen-ray installation, and a special throat room. There is also an up-to-date research laboratory, and a well-furnished operating theatre is available. The patients' bedrooms, fifty in number, face south, and have a beautiful view over the River Dee, with the Lower Grampian Mountains to the westward. The senior physician is Dr. Ian Struthers Stewart, who is assisted by Captain Johnston, R.A.M.C., with Mr. Robert Knox as clinical pathologist. There is an experienced matron and a staff of resident nurses. The terms are £5 5s. per week. The sanatorium can be reached from London by trains from King's Cross or Euston to Aberdeen, where a change is made for Murtle on Deeside. A conveyance meets patients by arrangement at Murtle Station and conveys them to the sanatorium, which is about a mile distant. Further particulars may be obtained on application to the secretary, Tor-na-Dee, Murtle, Aberdeenshire.

The Local Government Board issues from time to time a revised "List of Sanatoria and other Residential Institutions, approved by the Local Government Board under the National Insurance Act, 1911, for the treatment of persons suffering from tuberculosis, and resident in England (excluding Monmouthshire), with the names of the Administrative Counties and County Boroughs in which the Institutions are situate, and the date on which the approval expires in each case." The List can be obtained from H.M. Stationery Office, Imperial House, Kingsway, W.C. 2 (price 1d.). For particulars regarding the chief British Sanatoria reference should be made to "The Tuberculosis Year-Book and Sanatoria Annual," (price 7s. 6d. net). Guidance in the selection of centres for tuberculous children will be found in "The Year-Book of Open-Air Schools and Children's Sanatoria" (price 7s. 6d. net). These two reference books are published by Messrs. John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, Oxford Street, London, W. 1.

NOTICES OF BOOKS.

THE TUBERCULOSIS PROBLEM OF TO-DAY.

Professor Sir Robert W. Philip is the first occupier of the first Chair of Tuberculosis established in any British University. His inaugural address is one of exceptional interest, and merits the thoughtful consideration of all students of the tuberculosis problem. Sir Robert has devoted the best part of his life to the study of tuberculosis, and to the investigation and exposition of ways and means whereby it may be prevented and arrested. It is just and right that he should be the first Professor of Tuberculosis in the University of Edinburgh. It may be hoped that all other British Universities will now follow this lead. Certainly every medical school should have on its teaching staff an expert in tuberculosis. Sir Robert in his address ably sets forth the essentials of the tuberculosis problem as they are seen in these difficult war days.[1] We have need to realize the universality of tuberculosis. Nägeli of Zurich, in 1900, found signs of tuberculosis in 97 per cent. of bodies examined consecutively by him among persons dying in a general hospital from all sorts of diseases and accidents. Reinhart of Berne, in a communication published in October, 1917, stated that in a series of consecutive post-mortem examinations 96 per cent. showed evidence of tuberculosis; in 32 per cent. the tuberculosis was present in aggressive form, while in 64 per cent. the tuberculous lesions were to all intents and purposes healed. For the most part, tuberculosis is acquired in childhood. While infants are but seldom born tuberculous, most children develop tuberculosis in one form or another. The ravages of tuberculosis, although still appalling, have been considerably restricted. This is evidenced by the returns of the Registrar-General for England and Scotland in 1915. In England, 54,295 persons are recorded as having died of tuberculosis, a death-rate from all forms of 151 per 100,000 of the population. In Scotland, 7,819 persons are recorded as having died of tuberculosis, a death-rate of 163 per 100,000. As regards pulmonary tuberculosis alone in England there are said to have died 41,676 persons, a death-rate of 116 per 100,000; and in Scotland 5,291 persons, a death-rate of 111 per 100,000. In 1890 the death-rate from pulmonary tuberculosis in England was 168 per 100,000, as against 116 in 1915, a diminution of 30·9 per cent. In 1890 the death-rate from pulmonary tuberculosis in Scotland was 193 per 100,000, as against 111 in 1915, a diminution of 42·4 per cent. The comparison of the following death-rates per 100,000 of the population in 1915 is worth considering: Scotland, 111; England, 116; Germany, 142; Ireland, 172; France, 179. The figures for Austria and Russia are probably still higher. Sir Robert Philip does well to point out that there are serious fallacies in existing returns. "The mortality statistics as published by the Registrar-General include only deaths

[1] "Present-Day Outlook on Tuberculosis, being the Inaugural Address delivered on the Institution of the Chair of Tuberculosis in the University of Edinburgh, April 16, 1918." By Professor Sir Robert W. Philip, M.D., F.R.C.P., F.R.S.E. Pp. 20. Edinburgh: W. Green and Son, Ltd. 1918.

certified by the patients' doctor as having occurred from tuberculosis. It is common knowledge that many deaths occur from tuberculosis which are not thus certified, either because the disease has not been recognized or because it has been described euphemistically. What the patient died of and what he is said to have died of are not always one and the same thing. Many deaths are labelled as from pneumonia, bronchitis, measles, whooping-cough, or influenza, which are really referable to tuberculosis." Tuberculosis as it presents to-day is a live problem, teeming with issues which call for observation and investigation. Tuberculosis is kaleidoscopic, while the essential cause, the tubercle bacillus, and the primary lesion, the tubercle, are common to all cases. The expression of the disease is most varied. For reliable diagnosis and prognosis a trained clinician is essential, ready to apply the proper physiological and pathological methods for a complete investigation. With regard to treatment, Sir Robert Philip thinks there is a future for vaccine-therapy. He still believes that tuberculin may be of service in properly selected cases. As to chemo-therapy, he says: "The remarkable success attained in the treatment of infections by means of organic arsenic compounds makes one hopefully anticipate similar developments from chemo-therapy in the treatment of tuberculosis." A valuable review is given of the evolution of our chief anti-tuberculosis measures, and the present situation under war conditions is faced. "With the continuance of the war there has been traceable in some parts of the country an increase in the death-rate from tuberculosis. Without discussing particular causes, the fact is significant. We are still up against an aggressive infection with immense ramifications, whose ravages can only be checked and overcome by unremitting effort along assured lines. . . . We must try and estimate the bearings of tuberculosis as occurring in the British war services. Officers and men discharged because of tuberculosis return to civil life, and the State assumes certain responsibilities towards them. With this in mind, fullest use should be made of expert guidance available, within the services and outside, in respect of the examination of men before admission to the services, and in respect of the discharge of tuberculous men and their treatment and care. Men have been admitted to the services who should not have been passed. Probably some have been excluded unduly. Men have not been discharged who had better have been, and some discharged men might have been retained. After discharge, the subjects of tuberculosis have too often drifted for lack of direction. This might in large part be obviated, and the disturbing influence of the war be correspondingly limited." Sir Robert Philip insists on the importance of special training necessary for the study and treatment of tuberculosis and on the value of research. The scientific investigation of tuberculosis and the rational management of tuberculous causes furnish an object-lesson in medicine of the first importance. "The study of tuberculosis is well calculated to make a man think regarding the meaning and course of all disease. In the variability of its expression, in the methods of diagnosis and prognosis, and in the far-reaching questions of prevention and treatment, tuberculosis affords a fine object-lesson in medicine. Its teaching is not limited to tuberculosis. It is luminous with principles which give just proportion to the facts of disease, and inspire fresh efforts towards the realization of the ideals of health."

PHYSICAL DIAGNOSIS.

The tuberculosis officer and all other medical advisers called to deal with tuberculosis cases should make a point of studying all modern methods employed in the investigation of disease. There is real danger that tuberculosis specialists, especially such as restrict their practice to chest cases, will become limited in their outlook. The medical practitioner who desires to be the most accurate in his diagnosis and effective in his treatment must be a constant and faithful student of general medicine. With this general introduction we venture to recommend a study of the new and seventh edition of Dr. Austin Flint's admirable and widely used "Manual of Physical Diagnosis," which has been thoroughly revised and brought up to date by Dr. Henry C. Thacher.[1] The work provides a lucid, direct, reliable, and most serviceable exposition of auscultation and percussion both in health and disease, and is one which every clinician dealing with chest cases will do well to study. With regard to pulmonary tuberculosis, Turban's classification is given thus: "According to Turban, we may define the lesion as of three grades: By Grade I. we mean lesions extending at most to the volume of one lobe or two half-lobes. By Grade II., slight lesions extending farther than I., but at most to the volume of two lobes; or a severe lesion extending at most to the volume of one lobe. By Grade III., all lesions which in extent of the parts affected exceed II. By 'slight lesion' we understand disseminated centres of disease, which manifest themselves physically by slight dulness, by harsh, feeble, or broncho-vesicular breathing, and by râles. By 'severe lesion' we mean cases of consolidation and excavation such as betray themselves by marked dulness, by tympanitic resonance, by very feeble broncho-vesicular, bronchial, or amphoric breathing, and by râles of various kinds. Purely pleuritic dulness, unless marked, is to be left out of account; if it is serious, the pleurisy must be mentioned under the head of tuberculous complications." The limitations and defects of the Turban grouping are now recognized, and it is good to find that the superior classification suggested by the American National Tuberculosis Association is given: "INCIPIENT (FAVOURABLE).—Slight initial lesion in the form of infiltration, limited to the apex or a small part of one lobe. No tuberculous complications. Slight or no constitutional symptoms (particularly including gastric or intestinal disturbances or rapid loss of weight); slight or no elevation of temperature or acceleration of pulse at any time during the twenty four hours, especially after rest. Expectoration usually small in amount or absent. Tubercle bacilli may be present or absent. MODERATELY ADVANCED.—No marked impairment of function, either local or constitutional. Localized consolidation moderate in extent, with little or no evidence of destruction of tissue, or disseminated fibroid deposits. No serious complications. FAR ADVANCED.—Marked impairment of function, local and constitutional. Localized consolidation intense, or disseminated areas

[1] "A Manual of Physical Diagnosis." By Austin Flint, M.D., LL.D., late Professor of the Principles and Practice of Medicine and of Clinical Medicine in Bellevue Hospital Medical College, etc. Seventh Edition, revised by Henry C. Thacher, M.S., M.D., Assistant Attending Physician Roosevelt and Lincoln Hospitals, New York. Pp. 381, with 26 figures. Philadelphia: Lea and Febiger, 706-710, Sansom Street. 1917. Price $2.50.

of softening or serious complications. MILIARY TUBERCULOSIS." Many of the illustrations, particularly those of frontal sections of the thorax, are most instructive.

PULMONARY TUBERCULOSIS.

Dr. James T. Macmanus has recently issued an informing and suggestive monograph on certain essential matters relating to diagnosis and treatment of tuberculosis of the lungs.[1] The description of early physical signs and symptoms are based on the author's own experience. The most valuable part of the work is that which deals with the rôle of tuberculin in diagnosis and treatment. There are also sections on the use of X-rays and serum reactions in the diagnosis of tuberculosis of the lungs. The author's conclusions regarding data which justify a diagnosis of pulmonary tuberculosis are thus formulated: "(1) When there is a well-marked hæmoptysis without clear cause, with physical signs and symptoms however slight; and I think a provisional diagnosis should be made where there is free hæmoptysis without cause, especially if the family history is unfavourable. (2) When there is dulness, increased tactile vocal fremitus, altered breath sounds, and râles over one or more of the 'seats of election' for phthisis. (3) Idiopathic pleurisy occurring in a subject with bad family history, together with any other suspicious signs or symptoms, should at least suffice for making a provisional diagnosis. Painless pleurisy is especially significant. (4) Heavy root shadows, with distinct mottling in the immediate lung tissue, is very significant of active hilus tuberculosis. If there are other well-defined symptoms present sufficient to cause one to strongly suspect hidden tuberculosis, the X-ray picture should suffice to make a diagnosis of hilus tuberculosis. (5) An undoubted local reaction is pathognomonic of phthisis. A well-marked tuberculin reaction after a subcutaneous test dose of tuberculin, cutaneous hypersensitiveness (Ellis), or a marked reaction to 1 in 100 T. (III.) with suspicious signs and symptoms, should warrant a diagnosis of phthisis." The monograph closes with a useful bibliography.

HANDBOOKS ON TUBERCULOSIS.

We have just received copies of two manuals dealing with tuberculosis which call for special consideration. They are both by Dr. Edward O. Otis, Professor of Pulmonary Diseases and Climatology in the Tufts College Medical School, Boston, U.S.A. The first is a revised edition of his popular exposition of tuberculosis, written primarily to provide non-medical readers with a reliable, comprehensive, and serviceable account of the causation, nature, prevention, and arrest of this widely prevalent and devastating disease.[2] It is in every way most excellent, and may be strongly recommended to those who are undertaking popular lectures, holding tuberculosis classes, or seeking

[1] "Modern Methods in the Diagnosis and Treatment of Phthisis, with Special Reference to Tuberculin." By James T. Macmanus, M.B., B.Ch., B.A.O. (N.U.I.), D.P.H. (Oxford). Pp. 64. London: John Bale, Sons and Danielsson, Ltd., Oxford House, 83-91, Great Titchfield Street, W. 1. 1918. Price 2s. 6d. net.

[2] "Tuberculosis: Its Cause, Cure, and Prevention." A revised edition of "The Great White Plague" (A Book for Laymen). By Edward O. Otis, M.D. Pp. xix+328, with illustrations. New York: Thomas Y. Crowell Company, 426 and 428, West Broadway. 1918. Price $1.50.

by written or spoken words to combat this fell foe of mankind. Dr. Otis, in his preface to the new edition, says: "Perhaps the two most prominent lines of effort in the tuberculosis crusade at the present time among civilians are the attention given to the health of children, particularly in the schools; and the industrial work in mills, factories, and other establishments where large numbers of persons are employed." War and war conditions are leading to an increase of tuberculosis among all classes, and Dr. Otis's book is just the work which should now be studied with care by all British and American patriots anxious to meet the needs of these testing times. Unfortunately, it contains no index.

The second book written by Dr. Otis deals with pulmonary tuberculosis, and is intended to serve as a clinical manual for medical students and young practitioners.[1] The work is based on the author's long experience in teaching students the essential elements necessary for prompt and accurate diagnosis, reliable prognosis, and effective treatment. Although necessarily restricted, it provides an excellent introduction to the clinical study of pulmonary tuberculosis, and will prove of service to students whose opportunities for systematic teaching and adequate clinical experience have hitherto been far too restricted.

WORKS FOR MEDICAL ADVISERS AND VOLUMES FOR REFERENCE.

Dr. C. H. Browning, Director of the Bland-Sutton Institute of Pathology at the Middlesex Hospital, has edited a volume of suggestive studies on applied bacteriology, which we commend to all interested in present-day pathological problems.[2] The editor provides an introduction, in which the scope of applied bacteriology is well defined; and then follow a series of timely articles, the importance of which will be best indicated by an enumeration of titles and authors: "The Diagnosis of 'Enterica' Infections by Bacteriological Methods," by C. H. Browning, T. J. Mackie, and L. H. D. Thornton. "The Use of Calibrated Pipettes in Serological Work," by C. H. Browning. "Observations on the Diphtheria Group, with Special Reference to the Recognition of Pathogenic Members," by J. F. Smith. "Studies of Antiseptics: Relationships between Bactericidal Action and Chemical Constitution, with Special Reference to Selective Inhibitory Action on Different Species of Pathogenic Organisms; the Influence of Serum on Antiseptic Action; the Time Rate of Lethal Action; the Effect of Variations in the Number of Organisms; Bacteriological Action; Practical and Theoretical Bearings of the Investigation," by C. H. Browning, W. Gilmour, and R. Gulbransen. "The Isolation of Typhoid-Paratyphoid Bacilli from Fæces, etc., by Means of Enrichment with Brilliant

[1] "Pulmonary Tuberculosis: A Handbook for Students." By Edward O. Otis, M.D. Pp. vii + 220, with illustrations. Boston, Mass., U.S.A.: W. M. Leonard, 101, Tremont Street. 1917.

[2] "Applied Bacteriology: Studies and Reviews of Some Present-Day Problems for the Laboratory Worker, the Clinician, and the Administrator." Edited by C. H. Browning, M.D., D.P.H., Director of the Bland-Sutton Institute of Pathology, the Middlesex Hospital. Contributors: C. H. Browning, W. Gilmour, R. Gulbransen, T. J. Mackie, S. Russ, J. F. Smith, and L. H. D. Thornton. Pp. xvi + 291, with tables and illustrations. London: Henry Frowde, Oxford University Press and Hodder and Stoughton, Warwick Square, E.C. 1918. Price 7s. 6d. net.

Green and Telluric Acid in Fluid Medium: the Experimental Basis of the Method and a Review of Results," by C. H. Browning. "The Isolation of *B. diphtheriæ* by Means of a Simple Medium containing Telluric Acid," by J. F. Smith. "The Selective Action of Thallium Acetate in Suppressing *B. pyocyaneus* and Organisms of Proteus Type (*Uro-bacillus septicus*), and of Thorium Nitrate in Permitting Growth of *B. Mallei*," by C. H. Browning and R. Gulbransen. "On the Possibility of Employing Ultra-Violet Radiation as a Means of Discriminating between Organisms and for their Selective Isolation, with a Description of a Method of Determining the Effective Bactericidal Portion of the Ultra-Violet Spectrum," by C. H. Browning and Sidney Russ. "The Chemistry of Antibody Reactions, with Considerations on their Practical Application," by C. H. Browning. "The Immunity Reactions of the Coli Group," by T. J. Mackie, and "Tetanus," by C. H. Browning.

In the maintenance of health and in the management of disease breathing power is a matter of supreme importance. Dr. Haydn Brown has recently published a suggestive brochure which deals with the mechanism of breathing, and directs special attention to the importance of the diaphragm in athletics and voice training.[1] The subject is one which medical advisers would do well to study.

A work by Mr. R. J. Mecredy, the well-known expert in cycling and motoring matters, although not an absolutely new publication, is one which merits the consideration of medical advisers and all interested in hygienic management on open-air lines.[2] There are chapters on Preventive Hygiene, Fresh Air and Sunshine, Vitality, Exercise and Recreation, Mental Influences, Versatility and Variety, Food, Cycling, etc. The full-page illustrations form special features, and include representations of Dr. Marrell's Open-Air Canvas Hut, and a variety of Tents and Equipment for the open-air life.

The housing question is closely connected with the tuberculosis problem. A particularly suggestive and helpful collection of studies has been issued by the *Journal of the American Institute of Architects* under the general title of "The Housing Problem in War and in Peace."[3] It contains a fine series of illustrations and plans, many dealing with recent productions in this country at Gretna, Eltham, Woolwich, and elsewhere. The volume will be of particular value to architects and students of housing both in Britain and in America.

Many plans are being made for the establishment of farm colonies for tuberculous workers. Useful suggestions for enthusiasts engaged

[1] "Breathing Power for Health, Physical Culture, and Voice-Training Purposes." By Haydn Brown, L.R.C.P. (Edin.), etc. Pp. 64. London: George Allen and Unwin, Ltd., Ruskin House, 40, Museum Street, W.C. 1. 1918. Price 1s. 6d. net.

[2] "Health's Highway." By R. J. Mecredy. Pp. xiv+172, with illustrations. London: Yellon, Williams and Co., Ltd., the Celtic Press, 43, Chancery Lane, W.C. 1. Price 3s. 6d. net.

[3] "The Housing Problem in War and in Peace." By Charles Harris Whitaker, Editor of the *Journal of the American Institute of Architects*; Frederick L. Ackerman, Architect of New York City; Richard S. Childs, Secretary of the Committee on Industrial Forces, New York City; and Edith Elmer Wood, Expert in Housing Legislation, Philadelphia. Pp. 116, with plans and illustrations. Published by the *Journal of the American Institute of Architects*, The Octagon, Washington, D.C., U.S.A. 1918.

in such undertakings will be found in Mr. J. C. Newsham's recently issued book, "Farming Made Easy."[1] It is a thoroughly practical manual for amateur and new land workers, and even expert farmers may learn much from its interesting pages.

Alcoholism predisposes to tuberculosis. Alcohol is but rarely used in the treatment of tuberculosis. In the management of many tuberculous patients, and in the conduct of hospitals and sanatoria for tuberculous subjects, alcohol is apt to become an agent making for disorder. Medical superintendents of sanatoria and tuberculosis officers generally will do well to make themselves thoroughly acquainted with the scientific, economic, and sociological aspects of the alcohol problem. For a thoroughly sane and serviceable guide to the results of the most reliable researches regarding the action of alcohol reference should be made to the Special Report of the Advisory Committee of the Central Control Board (Liquor Traffic).[2] Lord D'Abernon has secured a thoroughly representative Committee of medical and other scientists, and their report affords a particularly reliable and illuminating account of the action of alcohol on the human organism.

Under the title of "The Tuberculin Test" Mr. Wilfred Buckley and Mr. James Mackintosh have prepared for the National Clean Milk Society an informing pamphlet which gives the essential facts relating to the application of the tuberculin test to cattle and urges that "the tuberculin test, properly administered, is more reliable as a means of determining the presence of tuberculosis than post-mortem examinations."[3]

Messrs. Butterworth and Co. have issued a 1918 edition of their "Medical Catalogue," which is admirably arranged alphabetically under subjects, and will be found invaluable for reference.[4]

The American National Association for the Study and Prevention of Tuberculosis has changed its address and wisely shortened its name. In future it is to be known as The National Tuberculosis Association. This great body is showing great energy and much wisdom in the conduct of the work. The Association now publishes *The American Review of Tuberculosis*, *The Journal of the Outdoor Life*, and the *Bulletin* of the National Tuberculosis Association. We commend these valuable journals to all students of the tuberculosis problem.[5]

[1] "Farming Made Easy: A Handbook for Farmers and Smallholders." By J. C. Newsham, F.L.S., Principal of the Monmouthshire Agricultural and Horticultural Institution. Pp. 190, with illustrations. London: C. Arthur Pearson, Ltd., Henrietta Street, W.C. 2. 1918. Price 3s. 6d. net.

[2] "Alcohol: Its Action on the Human Organism." Report of an Advisory Committee of the Central Control Board (Liquor Traffic). Published by H.M. Stationery Office. Price 2s. 6d. net. Paper covers, 1s. net. Under the title of "Alcohol as a Food, a Drug, a Poison," a serviceable survey of the official Report has been prepared and issued by the National Temperance League, Paternoster House, 34, Paternoster Row, E.C. 4. Price 3d.

[3] "The Tuberculin Test," by Wilfred Buckley and James Mackintosh. Pp. 13. London: The National Clean Milk Society (Incorporated), 2, Soho Square, W. 1. 1918. Price 6d.

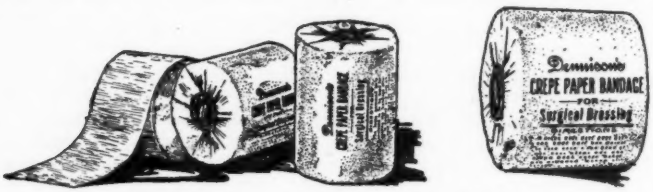
[4] "Butterworth's Medical Catalogue, 1918." Pp. 68. Published by Butterworth and Co. (India), Ltd., Post Box 251, 6, Hastings Street, Calcutta; London Office: 4, Bell Yard, Temple Bar.

[5] Full particulars of The National Tuberculosis Association of America and its publication can be obtained on application to Headquarters, 381, Fourth Avenue, New York City.

PREPARATIONS AND APPLIANCES.

PAPER SPECIALITIES FOR SANATORIA.

In the hygienic management of consumptives, both under institutional care and domiciliary conditions, it is essential that every care be taken to minimize the risk of patients infecting others. And in the treatment of all tuberculous lesions in these difficult days of war, it is most important that appliances shall be not only effective, but inexpensive.



THE DENNISON CREPE PAPER BANDAGES.

We have recently received specimens of Crepe Paper Sputum Papers, Towels, and Bandages, which we commend to the notice of all medical advisers dealing with tuberculous subjects.[1] The Sputum Papers are 7 × 7 and 10 × 10 inches in size, light, soft, strong, and pleasant in use. The Towels are 18 × 13 inches, and are put up in packages of 100, with punched holes for use with a specially designed Nickel Towel Holder. The Bandages are excellent, and meet a real need in these times, when there is a shortage of cotton fabrics. The bandages are available in all the standard widths, and the length of each roll is 15 yards. They are light, elastic, adaptable, and strong. They can be torn across, thus saving the use of scissors; and patients find them cool and comfortable. Moreover, they are hygienic and will economize the use of gauze, muslin, and ordinary cotton bandages.

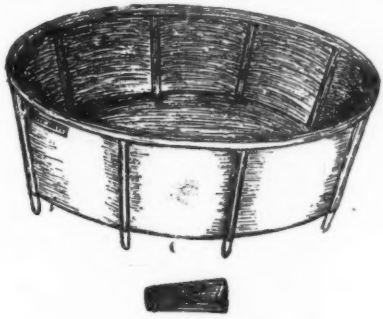
A FOLDING BATH.

The "Litewate" Folding Bath is finding much favour at the Front, and has been approved by caravanners and campers-out.[2] It is likely to be of considerable help in connection with some sanatoria and colonies for the tuberculous. Probably in the hygienic management of children in open-air camps it will be of special service. For all who

[1] The Dennison Manufacturing Company, Ltd., have their central offices at Sardinia House, 52, Lincoln's Inn Fields, Kingsway, London, W.C. 2. Specimens and further particulars and prices will be supplied on application.

[2] The "Litewate" Folding Bath is supplied by the Lightweight Tent Supply Company (sole proprietress, E. M. Williams), of 61, High Holborn, London, W.C. 1. Price 27s. 6d.; rigid pattern, 28s. 6d.; canvas case, 5s. 6d. extra.

are going in for an open-air existence, and desire to retain an Englishman's love and respect for his morning tub, this simple contrivance is to be commended. The essential features are indicated in the accom-



THE "LITEWATE" FOLDING BATH.

The upper figure shows the bath open, with wooden pegs in position ready to be inserted in the ground. The lower figure indicates the bath closed for packing.

panying figures. The bath when open has a diameter of 28 inches and a depth of 12 inches. The weight complete, with the eight wooden supports included, is only 15½ ounces.

THE "CROSS-KEY" BEDSTEAD.

A simple, ingenious, inexpensive, and effective form of bedstead has recently been introduced under the designation of the "Cross-Key" Bedstead.[1] This promises to be of service in hospitals and sanatoria, colonies, and camps, and particularly for use in residential schools and institutions for tuberculous and other delicate children. The bedstead is already being extensively used in connection with army service, and in hostels, offices, boarding houses, and for domestic use. It will be found of special help in munition works, and to meet air-raid emergencies. Boy scouts and girl guides have approved it. The "home" type of bedstead is compact, strong, durable, light, and can be moved, stored, or rolled up into a parcel 6 feet long. Moreover, it is inexpensive, and can be stored with ease. A type with hinged sides and proof canvas is available for army field service, and folds up into a parcel 3 feet 3 inches × 6 inches × 4 inches.

AN ORO-NASAL INHALER.

Dr. Muthu, the Medical Superintendent of the Mendip Hills Sanatorium, Wells, Somerset, elsewhere in the present number of this journal describes the advantages of continuous antiseptic inhalation

[1] The "Cross-Key" Bedstead is supplied by the "Cross-Key" Manufacturing Company (sole proprietor, H. Weston Wells, B.Sc.), 99, Tyrwhitt Road, Brockley, London, S.E. 4. Prices: scout or three-quarter size bed, 24s.; full-sized home beds from 29s.; service beds from 46s. 6d.

in the treatment of pulmonary tuberculosis. Dr. Muthu has introduced a form of ORO-NASAL INHALER, the chief points of which are shown in the accompanying illustration.[1] A special series of inhalant preparations containing anhydrous formaldehyde are available for use

DR. MUTHU'S ORO-NASAL INHALER.

with the inhaler. Undoubtedly medicaments administered by oro-nasal inhalation are often of the greatest service, not only in treating early cases, but in bringing alleviation of symptoms to the subject of extensive laryngeal and pulmonary involvement.

A NEW NASAL INHALER.

STOKE'S PATENT NASAL INHALER.

Messrs. Oppenheimer, Son and Co., Ltd., have sent us a specimen of the new STOKE'S PATENT NASAL INHALER.[2] It is intended to provide a means whereby patients may continue to inhale suitable medicaments during sleep. The nose-piece is of rubber and fits into the nostrils, with an opening at the end for the insertion of cotton-wool. The inhaler is recommended for use in cases of nasal trouble and catarrhal conditions involving the respiratory tract, and it is advised that it be used by night, when the nose and throat are liable to become congested. For use with the inhaler "Oscol" Inhalant is provided, a solution containing menthol, eucalyptol, etc., with a suitable base. A few drops are sprinkled on the cotton-wool, which is lightly packed in the inhaler. It has a pleasant and soothing effect on the nose and throat, and is not injurious to the membrane.

[1] Dr. Muthu's Oro-Nasal Inhaler and Inhalant Preparations are supplied by Messrs. Oppenheimer, Son and Co., Ltd., 179, Queen Victoria Street, London, E.C. 4, from whom full particulars may be obtained as to prices for institutions.

[2] The Stoke's Patent Inhaler is supplied in boxes with the inhalant and full instructions at 1s. 6d. each. The inhalant can be obtained in 1-ounce bottles at 1s. 6d. The makers are Messrs. Oppenheimer, Son and Co., Ltd., 179, Queen Victoria Street, London, E.C. 4.

THE COLLECTION OF SPUTUM.

There are many forms of flasks, bottles, and other vessels for the collection of sputum. For many hospital cases a wide-mouth receptacle is often the most convenient. In all cases the sputum must be kept free from invasion by flies. A convenient form of protector has been introduced under the name of the "LID-ON" COVER.[1] It is a simple appliance, which can be easily adjusted and clipped on to the rim of any suitable vessel. The cover can easily be taken to pieces and cleansed. It can be obtained electro-plated. The chief points in its construction are shown in the annexed figure.

THE "LID-ON" COVER.

ANTI-TUBERCULOSIS EDUCATIONAL PANELS.

The Council of the National Child Welfare Association, New York, acting in co-operation with the American National Tuberculosis Association, 381, Fourth Avenue, New York City, have issued a fine set of illustrated EDUCATIONAL PANELS, which by picture and forceful text set forth fundamental truths which must be brought home to the public if progress is to be made in the fight with tuberculosis.[2] These panels should be hung in all elementary schools, and have place in child welfare clinics, tuberculosis dispensaries, and like centres.

REQUISITES FOR TUBERCULOUS PATIENTS AND THEIR MEDICAL ADVISERS.

Aspirin and salicylates of German origin have for long been used in British hospitals and sanatoria. British manufacturers are now able to provide reliable preparations. Messrs. Menley and James, Ltd., have favoured us with specimens of their ACIDUM ACETYLSALICYLICUM, B.P. (Aspirin), and SODII SALICYLAS, B.P., and these in physical appearance, chemical reactions, and pharmacological effects, appear to be in every way equal to products of Teutonic origin.[3]

AMYCAÏNE, the new French local anæsthetic, promises to be of much service in dealing with certain tuberculous subjects.[4] It is Novocaine-Amyleine-Bi-Hydrochloride. Its anæsthetic action is said to be more rapid and lasting than novocaine, and its toxicity is low. It can be

[1] The "Lid-On" Cover is supplied by Messrs. J. Davies and Co., 43, Basinghall Street, London, E.C. 2. Price 8d.; nickel, 1s. 1d.; electro plated, 1s. 3d., post paid.

[2] The Panels are issued from the Headquarters of the National Child Welfare Association, Inc., 70, Fifth Avenue, New York, U.S.A.

[3] Full particulars regarding British manufactured Aspirin and Salicylates can be obtained on application to Messrs. Menley and James, Ltd., Menley House, Farringdon Road, London, E.C. 1.

[4] Full particulars regarding Amycaïne may be obtained on application to Messrs. A. Brezet and Co., 145, Wool Exchange, Coleman Street, London, E.C. 2.

sterilized without undergoing deterioration. It is hæmostatic, and acts as a cardiac stimulant, and does not produce local inflammatory reaction.

"ACROSYL" is an excellent form of British Lysol, which will be found particularly serviceable in dealing with sputum and for general use as a reliable, non-irritant, and safe germicide.[1] It contains from 50 to 55 per cent. of special cresols in neutral soap solution.

Another British form of "LYSOL" is now being supplied by Messrs. Evans, Gadd and Co., Ltd., of Exeter.[2] This Lysol (Gadd) is in every way a reliable, inexpensive, and effective antiseptic, disinfectant and cleansing agent; well adapted for use in hospitals and sanatoria, and for employment by patients in their own homes. It can be used for surgical, dental, and general nursing purposes, for ordinary domestic service, and for the disinfection of linen and clothing. It is excellent for the preparation of a foot-bath for tender and odorous feet.

Under the designation of "VITOFACT" SALT there has recently been introduced a special table preparation rich in vitamines. It can be used at meals just like ordinary table salt. "VITOFACT" PULVERETTES are also available.[3]

[1] Particulars and specimens of "Acrosyl" may be obtained on application to the manufacturers, Messrs. R. Graesser, Ltd., Chemical Works, Ruabon, North Wales.

[2] Full particulars regarding Lysol (Gadd) may be obtained from the manufacturers, Evans, Gadd and Co., Ltd., 97-100, Fore Street, Exeter, and 61, Cheapside, E.C. 2.

[3] Full particulars regarding "Vitofact" may be obtained from Messrs. Oppenheimer, Son and Co., Ltd., 179, Queen Victoria Street, London, E.C.

THE OUTLOOK.

PUBLIC HEALTH (TUBERCULOSIS) REGULATIONS, 1918.

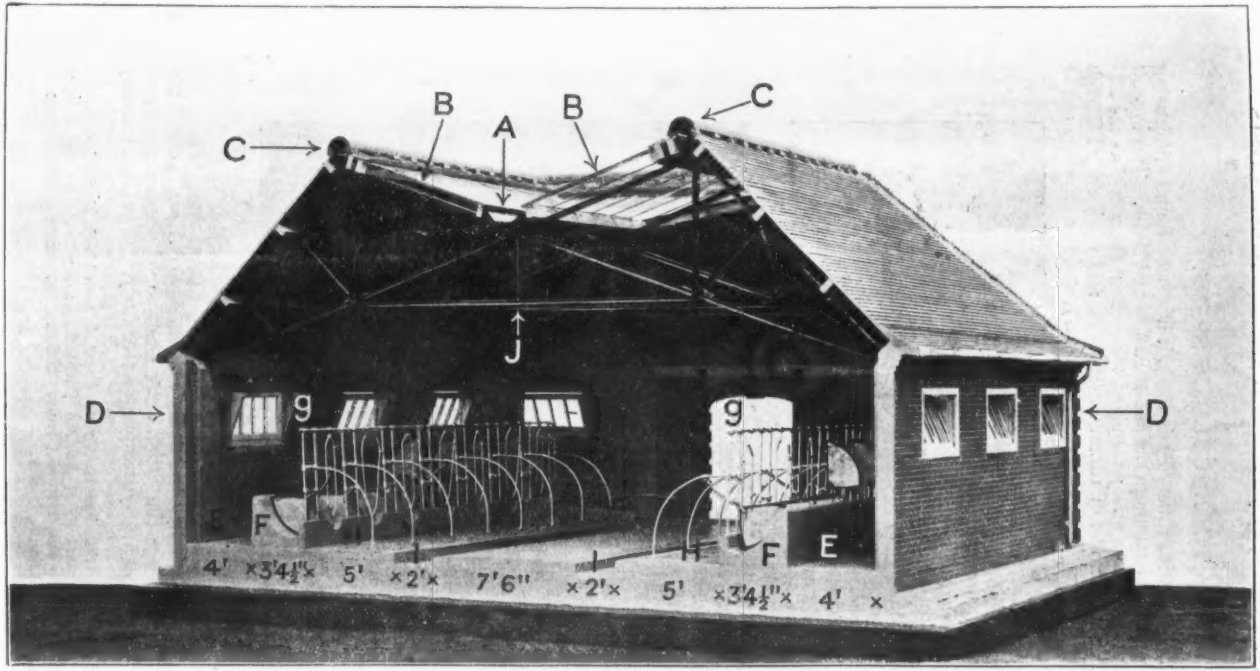
THE Local Government Board has issued a circular to Metropolitan Boroughs, Boroughs, and Urban and Rural Districts, referring to the provisions of the Public Health (Tuberculosis) Regulations, 1912, the Public Health (Tuberculosis) Regulations, 1916, and the Public Health (Tuberculosis) Regulations, 1917, under which Medical Officers of Health are required to furnish the Chief Commissioner of Medical Services, at the Ministry of National Service, with particulars of male persons between certain specified ages who have been notified as suffering from tuberculosis. In view of the recent alterations in the limits of age of men liable to military service, the Board have issued an Order to meet the altered circumstances. The Order rescinds the Regulations of 1916 and 1917, and prescribes anew the duties of Medical Officers of Health, but the procedure with respect to the transmission of the lists, both of old cases (under Article II. (*a*) of the Order) and of new cases (under Article II. (*b*)), will be similar to that under the previous Regulations. With reference to Article II. (*a*), it may in some cases be difficult for the Medical Officer of Health to ascertain whether a notified person was within the specified limits of age on January 1, 1916, but Mr. Hayes Fisher considers that all doubtful cases should be included in the lists supplied to the Chief Commissioner. The notifications should be forwarded by post in a sealed envelope (which need not be stamped) addressed in the manner prescribed by the Order, and marked "O.H.M.S." The order makes the following Regulations: *Article I.*—Expressions in these Regulations, unless the contrary intention appears, have the same meaning as the like expressions have in the Regulations of 1912. *Article II.*—(*a*) Every Medical Officer of Health shall forthwith send to the Chief Commissioner of Medical Services, Ministry of National Service, Westminster, London, S.W. 1, in the form shown in the Schedule to this Order, a list containing the names and other specified particulars of all male persons entered in the Register kept by the Medical Officer of Health in pursuance of subdivision (2) of Article XI. of the Regulations of 1912 who were between the ages of forty-five and forty-nine years on the first day of January, 1916. (*b*) Every Medical Officer of Health shall send to the said Chief Commissioner of Medical Services the name and other specified particulars of every male person between the ages of sixteen and fifty-three years hereafter entered in the said Register within a week after the entry is made therein. *Article III.*—All information received in pursuance of these Regulations and of the Regulations hereby rescinded shall be regarded by every person who has access thereto as confidential. *Article IV.*—Any expenses incurred by a Medical Officer of Health in carrying out the duties imposed upon him by the Regulations and by the Regulations hereby rescinded shall

be defrayed by the Local Authority of the District for which he is Medical Officer of Health. *Article V.*—This Order may be cited as the Public Health (Tuberculosis) Regulations, 1918, and shall be in force during the continuation of the present war.

A HYGIENIC COW BARN.

The accompanying illustration, which we are enabled to reproduce through the courtesy of the National Clean Milk Society, points its own moral, and the description placed below indicates essential features. Undoubtedly milk is a means whereby tuberculosis is spread, particularly to infants and young children. In the strengthening of delicate children and adolescents, and as a means for meeting the malnutrition of tuberculous and tuberculously disposed subjects, milk is a food of the greatest value. It is therefore of paramount importance that medical superintendents of sanatoria, residential schools, as well as private medical practitioners, should exercise every possible care in securing a pure milk supply for cases under their care. The National Clean Milk Society have recently published a valuable leaflet [1] which medical advisers may well recommend to those responsible for the safeguarding of the milk supply. We reproduce the advice so succinctly and effectively presented. The leaflet is entitled "How to find out whether the Milk you buy is Clean and Wholesome," and the following are the points to which special attention is to be directed. "(1) Find out whether the milk that is being obtained is wholesome by ascertaining the numerical bacterial content, and the presence or absence of *bacillus tuberculosis* and *bacillus coli* (the latter indicating the presence of manure). The medical officer of health for the district should be applied to for the name and address of the nearest bacteriological laboratory. (2) Ask the milk dealer for permission to examine his methods of handling milk at his shop, and also notice his methods of distribution. (3) Ask the dealer whether he can show you a certificate from a veterinary surgeon stating that all the cows on the farms from which he buys milk are regularly examined by him, and are free from tuberculosis. (4) Notice the condition of the churns in which the milk is sent from the farm, paying particular attention as to whether the lids fit properly, and whether they are so shaped that no water or dirt falling on them can get into the churn. (5) Find out from what farm the milk comes, and then visit that farm unexpectedly at milking time. Take a 'Score Card for Dairy Farm Inspection' (to be obtained from the Secretary of the National Clean Milk Society if not from the medical officer of health), and, following its guidance, note the circumstances under which the milk is produced and the manner in which it is handled. (The covered milking bucket is a very important means of preventing contamination.) It takes time and trouble to do all this, but clean wholesome milk is a necessity, and until the Government grades milk so that you (and the authorities) may know what kind of milk you are buying, you will wish to do what you can towards providing yourself with a decent supply."

[1] Copies of the leaflet, "How to find out whether the Milk you buy is Clean and Wholesome," may be obtained for distribution on application to the Secretary of the National Clean Milk Society (Incorporated), 2, Soho Square, London, W. 1.

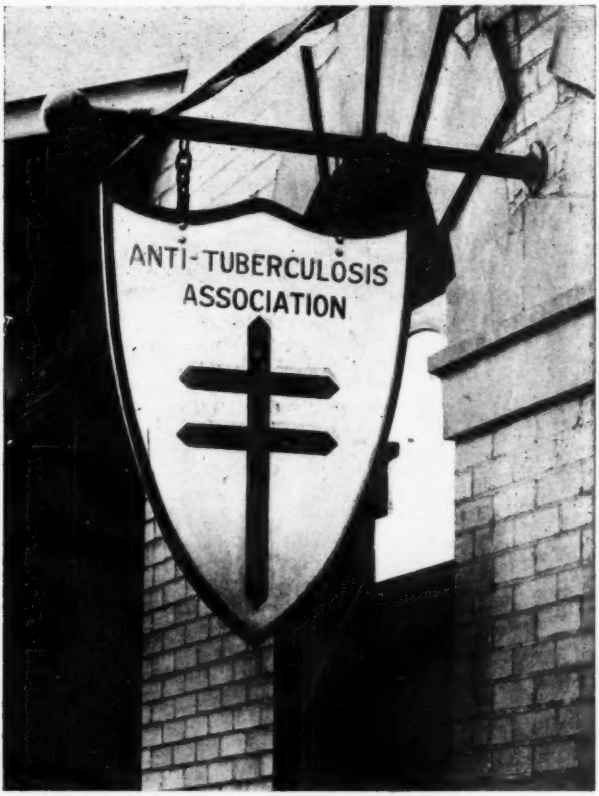


SECTIONAL VIEW OF A MODERN COW BARN.

(A) Rain Gutter. The water flows away at the centre of the building through a pipe leading from the gutter to the eaves. (B) The four inside slopes to the roof are glass. (C) Ridge tiles are raised 2 inches over openings 4 inches wide, that run the full length of each roof span at its apex, so that hot air may escape. (D) Hopper windows that can always remain open, as no draught strikes the animals. Each wall contains as many windows as it is possible to provide, having regard to the weight of the roof. A cross draught is very valuable as a means of ventilation. (E) Concrete feeding alleys 4 feet wide. (F) Concrete mangers 3 feet 4½ inches over all, with lifting metal divisions attached to the stanchions. (G) Metal stanchions. (H) Standings 3 feet 6 inches wide and 5 feet long, with a fall of 1½ inches (for large cows). Were the usual high mangers used, with the ordinary means of tying up the cows, the standings would be 6 inches longer. Standings are almost always built too long, with the result that the cows lie in their manure. Cork brick makes a good floor to the standings, but the last 4 inches should be concrete to keep the bricks in place. (I) Manure gutter 2 feet wide, 10 inches deep, with fall of 1 inch in 8 feet. (J) An overhead trolley can be provided for removal of manure. The brick walls, 4½ inches thick (with 9-inch pilasters), are faced with cement, and the floors (except of standings) are concrete, so that the whole building can be easily washed down. No wood is used in the construction of the building except in the lining of the tile portion of the roof, the windows, and the doors. Water is laid on to the mangers and to suitably situated stand pipes.

TUBERCULOSIS SIGNS.

In connection with tuberculosis work, it has been found stimulating and serviceable to encourage the use of badges and signs. The special form of double cross is now recognized throughout the world as the distinctive mark indicative of tuberculosis work and workers. Through the courtesy of Miss Rosa Lowe, the secretary, and the directors of the



THE TUBERCULOSIS SIGN.

Anti-Tuberculosis Association of Atlanta, U.S.A., we have been permitted to reproduce the artistic and effective "Tuberculosis Sign" which is being employed by this progressive body.[1] The sign scarcely

[1] The above illustration has been reproduced from a block kindly lent by the Anti-Tuberculosis Association of Atlanta, devoted to the prevention and cure of tuberculosis in Atlanta and Fulton County, U.S.A., the offices of which are at 23, East Cain Street, Atlanta, U.S.A.

requires a description, for it tells its own tale, and points its own moral. The sign is made of steel, and is $2 \times 1\frac{1}{2}$ feet in size. It is painted white, with a border of red, upon which is a double red cross, the emblem of the anti-tuberculosis crusade.

TUBERCULOSIS IN LONDON.

Dr. F. N. Kay Menzies, the Principal Assistant Medical Officer of Health of the London County Council, in a lecture recently delivered at the London School of Economics on "The Anti-Tuberculosis Campaign in London," stated that tuberculosis in England and Wales killed 60,000 persons annually, and that in London alone 10,000 persons died from it every year. The movement for the provision of special dispensaries and institutional treatment had accomplished much. In July, 1914, when the campaign was started, there were thirty beds available in hospitals and sanatoria for the treatment of children, and no beds for adults. The total accommodation at present was for about a thousand cases—800 children and 200 adults. Owing to the difficulty of providing fresh buildings, hundreds of discharged soldiers were awaiting admission to sanatoria. In the future, there would probably be considerable development in the provision of farm and garden colonies. There was also likely to be arrangements for the segregation of advanced cases, and more open-air schools for children would have to be found. Lastly there must be improved conditions of houses and the removal of insanitary areas.

Dr. W. H. Hamer, in his recent report to the London County Council, furnishes valuable data regarding tuberculosis in London.[1] The number of deaths from pulmonary tuberculosis among the civil population during 1917 was 6,908. There has been a serious increase in the mortality rate. This is very ominous, since for nearly fifty years the phthisis mortality in London has, with occasional years or short periods of exception, persistently fallen. The first indication of a pause in the decline was in 1914. "The hardship and exposure of war directly and immediately affected the mortality of males of military age, but as there has also been an increase in the female mortality during the war period, other causes must be looked for." Probably the consequences of notification of tuberculosis are now acting. "Emigration to the Colonies and resort to Continental sanatoria must largely have been arrested on the outbreak of war, and, simultaneously, the great increase of sanatorium treatment in the United Kingdom under the Insurance Acts must have led to the retention in this country of a certain number of phthisics; doubtless, deaths among these, which before the war would have been recorded elsewhere, are now included in London records." The number of "primary" cases of tuberculosis notified during 1917 was 18,735; of these 14,871 were pulmonary and 3,864 other forms of tuberculosis. These last returns include cases occurring among soldiers and sailors. London makes but meagre provision for its tuberculous children. Arrangements have been

[1] London County Council—"Report of the County Medical Officer of Health and School Medical Officer for 1917." Pp. 43. Issued from 2, Savoy Hill, Victoria Embankment, W.C. 2; and published by P. S. King and Son, Ltd., 2 and 4, Great Smith Street, Victoria Street, Westminster, S.W. 1. 1918. Price 1s.; post free, 1s. 2d.

renewed for the use of 231 sanatorium and hospital beds in voluntary institutions, and for the acceptance of beds as available in Metropolitan Asylums Board institutions. During 1917, 784 children received treatment in residential institutions. In addition, through the I.C.A.A., with financial assistance from the L.C.C., some 400 beds were available. Returns from twenty-two of the twenty-seven local tuberculosis dispensaries showed that upwards of 10,300 child patients, ranging from babyhood to sixteen years of age, were in attendance; of these 7,590, including 3,839 boys and 3,751 girls, were of compulsory school age. London possesses two open-air schools. Recently there have been established day sanatoria attached to certain of the tuberculosis dispensaries. Good work has also been carried out in the so-called playground classes.

NOTES AND RECORDS.

We are glad to receive copies of the annual reports of tuberculosis officers and all hospitals, sanatoria, and institutions or societies conducting tuberculosis work. We much regret that the exigencies of space under existing war conditions make it impossible to give full notices such as we should desire, and hope some day to be in a position to provide.

The Fifty-eighth Report of the Mount Vernon Hospital for Consumption and Diseases of the Chest contains the record of the committee of management respecting the work there carried on, and shows that the institution is in a most flourishing condition, and is accomplishing valuable service both in connection with the out-patient department at 7, Fitzroy Square London, W. 1, and its county hospital at Northwood, Middlesex.[1]

Dr. H. Hyslop Thomson, the County Medical Officer of Health and County Tuberculosis Officer for Hertfordshire, has just issued his Fifth Annual Report on Tuberculosis in the County of Hertford for the year 1917, which shows that there has been no rise in the death-rate from tuberculosis.[2] The measures desirable for preventing the spread of the disease are thus concisely summarized: "A clean, healthy house with healthy surroundings; education; good food of sufficient quantity and variety, and well cooked; a milk supply free from contamination by tubercle bacilli; adequate wages and healthy employment; disinfection; destruction of infected sputum and discharge; and the hospital treatment of advanced cases."

The Canadian Association for the Prevention of Tuberculosis is accomplishing notable service throughout the Dominion, as is evidenced by its last report, which contains records of the seventeenth annual meeting and returns from all centres in Canada.[3] The volume is effectively illustrated.

[1] Copies of the Annual Report of the Mount Vernon Hospital may be obtained on application to the Secretary, Mr. W. J. Morton, at the Central Offices, 7, Fitzroy Square, London, W. 1.

[2] "Fifth Annual Report on Tuberculosis in the County of Hertford for the Year 1917." By H. Hyslop Thomson, M.D., D.P.H.

[3] "The Seventeenth Annual Report of the Canadian Association for the Prevention of Tuberculosis, with Transactions of the Annual Meeting held in Ottawa, September 26, 1917." Issued by the Secretary, Dr. George D. Porter, Bank Street Chambers, Ottawa, Canada.

The last report of the Barlow Sanatorium Association for Poor Consumptives gives full details of the good work which is being accomplished at Los Angeles.[1]

The last report of the New Haven County Anti-Tuberculosis Association contains a number of instructive illustrations and interesting particulars of the development of the work at Gaylord Farm Sanatorium.[2]

The last report of the Massachusetts Anti-Tuberculosis League contains records of the annual meeting and a number of instructive signed articles by tuberculosis experts.[3]

The summer issue of the *Bulletin of the Chicago Tuberculosis Institute* contains a record of the proceedings of the twelfth annual meeting of the Institute, and a very full report of the work accomplished during the preceding year.[4]

The Thirty-Third Annual Report of the far-famed Trudeau Sanatorium is a publication of exceptional interest, giving in detailed tabular form particulars regarding each patient.[5] There are also a number of studies from the research laboratory: "Serological Studies in Tuberculosis," by S. A. Petroff; "Prognosis in Tuberculosis from the Standpoint of the Occurrence of Hæmoptysis and Tubercle Bacilli in the Sputum," by Fred H. Heise; "The Pleural Reaction to Inoculation with Tubercle Bacilli in Vaccinated and Normal Guinea-Pigs," by Robert C Paterson; and "Experimental Tuberculosis of the Liver," by W. B. Soper.

Sir William Treloar, Bart., the Founder and Chairman of the Lord Mayor Treloar Cripples' Hospital and College, has contributed a highly interesting and informing article to the *Nineteenth Century* for September on "The Cure of Tuberculous Children," in which the evolution of the beneficent and scientifically directed work for young tuberculous subjects at Alton, in Hampshire, is fully described.[6]

[1] "Fourteenth Annual Report of the Barlow Sanatorium Association (Incorporated), Chavez Ravine, Los Angeles, California, U.S.A."

[2] "Thirteenth Annual Report of the New Haven County Anti-Tuberculosis Association. Concerning the Work of the Gaylord Farm Sanatorium." Published at Wallingford, Conn., U.S.A.

[3] "Massachusetts Anti-Tuberculosis League: Third Annual Report, 1917." Published at the Central Offices, 3, Joy Street, Boston, Mass., U.S.A.

[4] *The Bulletin of the Chicago Tuberculosis Institute* is issued from the Central Headquarters of the Anti-Tuberculosis Movement in Chicago, 8, South Dearborn Street.

[5] "The Thirty-Third Annual Medical Report of the Trudeau Sanatorium, and the Thirteenth Medical Supplement for the Year ending October 31, 1917, together with the Studies of the Edward L. Trudeau Foundation for Research and Teaching in Tuberculosis."

[6] The Offices of Lord Mayor Treloar Cripples' Hospital and College are at Moorgate House, 61, Moorgate Street, London, E.C. 2, from whence fuller particulars may be obtained.

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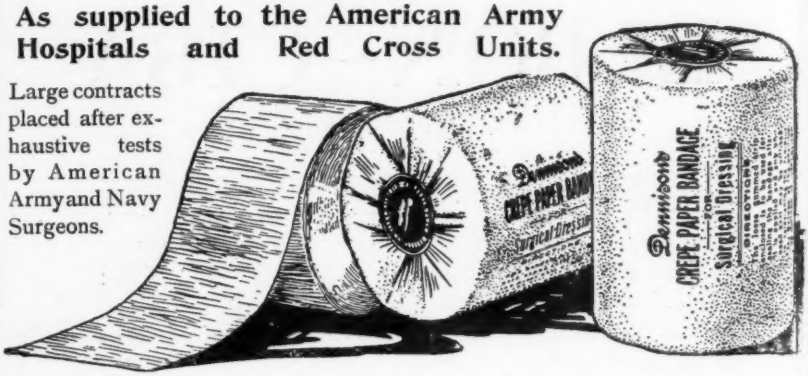

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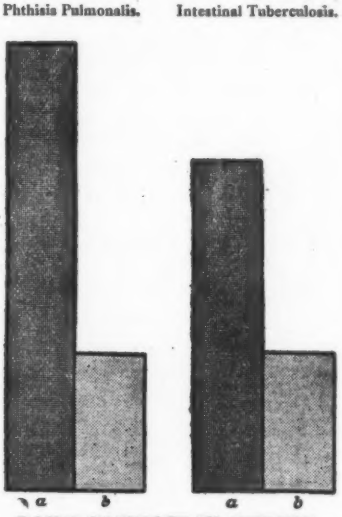

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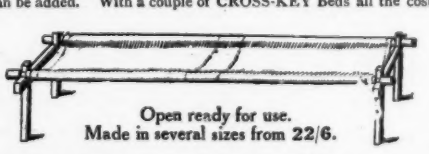

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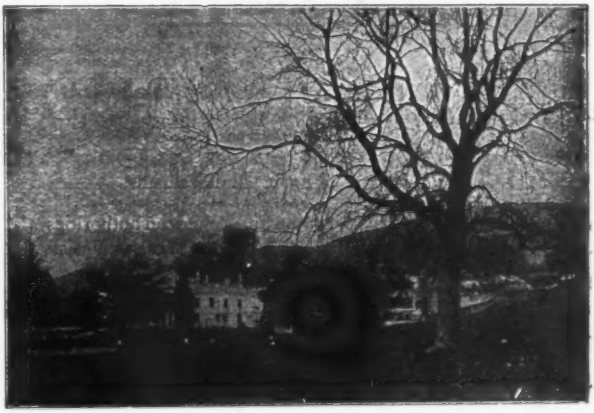

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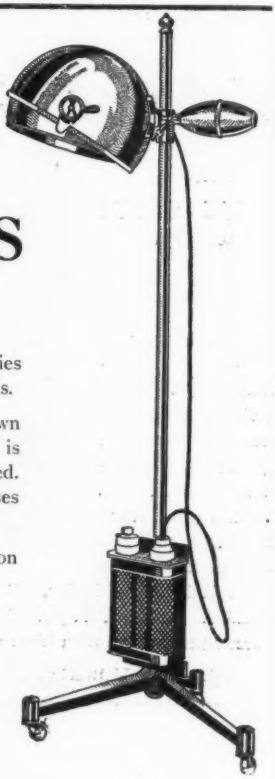

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